

**In the claims:**

Claims 1-10 (canceled)

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11. (new) A method of source normalization for modeling of speech comprising the

steps of:

providing an initial speech recognition model and

performing a set of transformations on said initial speech recognition model or following

new speech recognition models to reduce the recognition error rate by determining new

speech recognition models and determining new transformations jointly with the new

speech recognition models.

12. (new) The method of claim 11 wherein said set of transformations includes an

application of an estimation maximization algorithm.

13. (new) An improved speech recognition system comprising:

a speech recognizer; and

a source normalization model coupled to said recognizer for recognizing incoming speech;

said model derived by a method of source normalization training for HMM modeling of speech comprising the steps of:

providing an initial speech recognition model;

performing on said initial speech recognition model or following new speech recognition

models transformation steps to get a new speech recognition model to reduce the

recognition error rate by determining new speech recognition models and determining

new transformations jointly with new speech recognition models; said transformation

steps including application of estimation maximization algorithm.

14. (new) An improved speech recognition system comprising:

a speech recognizer; and

a source normalization model coupled to said recognizer for recognizing incoming speech; said model derived by a method of source normalization training for HMM modeling comprising the steps of:

a) providing an initial speech recognition model and

b) performing on said initial speech recognition model the following steps to get a new speech recognition model:

b<sub>1</sub>) estimation of intermediate quantities;

b<sub>2</sub>) performing re-estimation to determine probabilities;

b<sub>3</sub>) deriving mean vector and bias vector; and

b<sub>4</sub>) solving jointly for mean vector and bias vector.

15. (new) The recognizer of Claim 14 including the step b<sub>5</sub>) of replacing old speech recognition model for the calculated ones and step c ) determining after a new speech recognition model is formed if it differs significantly from the previous speech recognition model and if so repeating the steps b<sub>1</sub>-b<sub>5</sub>.


16. (new) The recognizer of claim 14 wherein said step b<sub>2</sub> includes one or more of performing re-estimation to determine initial state probability, transition probability, mixture component probability and environment probability.

17. (new) The recognizer of claim 14 wherein said step b<sub>2</sub> includes performing re-estimation to determine initial state probability, transition probability, mixture component probability and environment probability.

18. (new) The recognizer of claim 14 wherein said step  $b_4$  includes solving jointly for mean vector and bias vector using linear equations and determining variances and transformations.

19. (new) The recognizer of claim 17 wherein said step  $b_4$  includes solving jointly for mean vector and bias vector using linear equations and determining variances and transformations.

20. (new) The recognizer of claim 19 including the steps of replacing old speech recognition model for the calculated ones and determining after a new speech recognition model is formed if it differs significantly from the previous model and if so repeating the steps  $b_1$ - $b_5$ .

 21. (new) A method of source normalization for modeling of speech comprising the steps of:

a) providing an initial speech recognition model and  
b) performing on said initial speech recognition model the following steps to get a new speech recognition model:

- $b_1$ ) estimation of intermediate quantities;
- $b_2$ ) performing re-estimation to determine probabilities;
- $b_3$ ) deriving mean vector and bias vector; and
- $b_4$ ) solving jointly for mean vector and bias vector.

22. (new) The method of Claim 21 including the step  $b_5$ ) of replacing old speech recognition model for the calculated ones and step c ) determining after a new speech recognition model is formed if it differs significantly from the previous speech recognition model and if so repeating the steps  $b_1$ - $b_5$ .

23. (new) The method of claim 21 wherein said step  $b_2$  includes one or more of performing re-estimation to determine initial state probability, transition probability, mixture component probability and environment probability.

24. (new) The method of claim 21 wherein said step  $b_2$  includes performing re-estimation to determine initial state probability, transition probability, mixture component probability and environment probability.

25. (new) The method of claim 21 wherein said step  $b_4$  includes solving jointly for mean vector and bias vector using linear equations and determining variances and transformations.

26. (new) The Method of claim 24 wherein said step  $b_4$  includes solving jointly for mean vector and bias vector using linear equations and determining variances and transformations.

27. (new) The method of claim 26 including the step  $b_5$ ) of replacing old speech recognition model for the calculated ones and step c) determining after a new speech recognition model is formed if it differs significantly from the previous speech recognition model and if so repeating the steps  $b_1$ - $b_5$ .

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